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10/612,658	07/02/2003	Michael P. Galligan	4576/4581A	5534

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EXAMINER	
NGUYEN, NGOC YEN M	

ART UNIT	PAPER NUMBER
1754	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/612,658	Applicant(s) GALLIGAN ET AL.	
	Examiner Ngoc-Yen M. Nguyen	Art Unit 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 12 June 2006.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-3,5,6 and 30-36 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-3,5,6 and 30-36 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-3, 5-6, 31-34, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida et al (4,455,281) in view of EP 0 831 211.

Ishida et al discloses a plate-shaped catalyst unit for NO_x reduction of exhaust gas (note title). The catalyst unit is produced by a method comprising the steps of spraying molten metal upon the surfaces of a metal plate to allow the molten metal to accumulate thereon to form rough surfaces and depositing a catalyst containing titanium and at least another catalytic material for NO_x reduction of exhaust gas onto said rough surfaces whereby the catalyst is firmly secured on said rough surfaces (note claim 1). Ishida '281 further discloses that forming the surfaces of the metal plate into rough surfaces is effected by molten metal spraying. In the typical case, a metal wire is heated to be molten by contact resistance of electricity, an electric arc or high temperature flames, and molten metal thus obtained are sprayed together with gas such as compressed air through nozzles on the surfaces of the metal plate in the forms of very small droplets of molten metal allowing the molten metal to solidly secured thereto. As the molten metal sprayed, the same type of material as the metal plate is preferred. Then a catalytic substance is attached onto the surfaces of the metal plate formed into rough surfaces by the molten metal spraying (note column 4, line 62 to column 5, lines 13).

The metal plate can be thin steel plates, such as ASTM type 430, type 410 and type 304 (note column 4, lines 53-61). Ishida '281 also discloses that a metal wire

mesh can be used instead of metal plate (note column 1, lines 55-58). Moreover, the expanded metal in the form a perforated metal plate (note Figure 5) is considered the same as a "monolithic honeycomb carrier substrate".

In Ishida '281, Figure 4 is considered as having corrugated structure. Since the metal plate in Ishida '281 can be bent, one skilled in the art would be able to use such metal plate to form a conformable catalyst member as required in the instant claims.

The difference is Ishida '281 does not disclose that a tube of corrugated construction.

EP '211 discloses an exhaust emission control device for internal combustion engines (note column 1, lines 11-19). Such device can have a catalytic metal bearing (or support) member which can be a hollow cylinder (i.e., tube), which is made of a porous metal sheet, (note Figures 12-13 and column 11, lines 39-42) or a corrugated porous plate (note Figure 16C). EP '211 further discloses that the "steel sheet" bearing catalytic metal should be understood as not being limited to the construction described in relation to various embodiments and modifications and also as not being limited to the porous sheet (note column 14, lines 17-22). Thus, EP '211 fairly suggests that the hollow cylinder can be made from other type of metal sheet, such as the corrugated porous plate of Figure 16C.

For the limitation regarding the shape of the support member, it would have been obvious to one skill in the art at the time the invention was made to shape the catalyst support member of Ishida '281 as a corrugated, perforated tube, as suggested by EP '211 because such shape is desired for catalyst used in internal combustion engine.

Claims 30, 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida '281 in view of EP '211 as applied to claims 1-3, 5-6, 31-34, 36 above, and further in view of Donomoto (4,798,770) or Draghi et al (6,042,879).

The difference not yet discussed is Ishida '281 does not disclose that the anchor layer comprises nickel and aluminum.

However, Ishida '281 teaches that the molten metal sprayed is preferred to be the same type of material as the metal plate (note column 5, lines 9-10) and the metal plate is desired to be heat resistance and corrosion resistance (note column 4, lines 53-61) such as stainless steel. However, the teaching of Ishida '281 should not be limited to just the exemplified metals.

Donomoto '770 discloses that alloys include Ni-Cr alloys, Ni-Al alloys containing 3-20% Al, Ni-Cr-Al alloys, Ni-Cr-Al-Y alloys are heat and corrosion resistant (note column 5, lines 51-63).

Alternatively, Draghi '879 teaches that MCrAlY, where M is nickel and/or cobalt, has corrosion and heat resistant properties (note column 4, lines 7-14). It would have been obvious to one skilled in the art to optimize the composition of the MCrAlY alloy to obtain the desired corrosion and heat resistant properties.

It would have been obvious to use any known metal which is heat and corrosion resistance, such as the MCrAlY alloys suggested by Donomoto '770 or Draghi '879 for the catalyst of Ishida '281 because heat and corrosion metal is desired in Ishida '281.

Claims 1-3, 5-6, 30-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorynin (5,204,302) in view of EP '211, optionally further in view of Rondeau (4,027,367) and Ishida '281.

Gorynin '302 discloses a catalyst comprising a metallic substrate; an adhesive sublayer diffusion bonded onto said substrate; and a catalytically active layer deposited on said sublayer and a porous layer deposited on said catalytically active layer (note claim 1). The adhesive sublayer is prepared from thermally reactive powders, such as those prepared from nickel and titanium, aluminum with at least one or more of Co, Cr, Mo, Ta, Nb, Ti or Ni or silicon with at least one or more of Ti, Nb, Cr, W, Co, Mo, Ni or Ta (note column 2, lines 25-35). For the composition of the Ni alloy used, it would have been obvious to one of ordinary skill in the art to optimize such composition to obtain the best adhesive layer.

Gorynin '302 further discloses that the catalyst can be used for the purification of waste gases from an internal combustion engine (note column 1, lines 6-10). Gorynin '302 further discloses that because of the strong adhesion of the catalyst layers to the substrate, the catalyst can be corrugated and punched after deposition of the catalyst layer (note column 3, lines 57-60). Furthermore, Gorynin '302 discloses the step of rolling a corrugated catalyst strip into a cylinder (note column 9, lines 64-67).

The adhesive layer in Gorynin is formed by plasma spraying. The thermally reactive powders is introduced into a plasma torch and an exothermic reaction is initiated in the torch. The exothermic powders impinge the substrate where the reaction continues. The heat generated in the reaction causes diffusion of the sub-layer into the

substrate resulting in a diffusion bond and strong adhesion of the sublayer to the substrate (note column 3, lines 6-15). Thus, Gorynin '302 fairly teaches that the plasma spraying process is used to obtain a diffusion layer which improves the bonding between the two layers.

The process limitation in claim 6 is noted. However, when the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to applicant to establish that their product is patentably distinct and not the examiner to show the same process of making. *In re Brown*, 173 USPQ 685 and *In re Fessmann*, 180 USPQ 324.

Optionally Rondeau '367 is applied as stated below to teach the use of electric arc to form the adhesive layer.

Rondeau '367 discloses a method of thermal spraying a substrate to deposit a self-bonding coating on such substrate, comprising supplying an electric arc thermal spray gun with a wire feed comprising an alloy of nickel and aluminum or titanium, and using such electric arc thermal spray gun, spraying said wire feed onto such substrate to coat the same thereby to establish diffusion bond between such coating and such substrate to provide a self-bonding coating on such substrate (note claim 1). Rondeau '367 discloses that several types of thermal spraying guns are available including combustion flame spray guns, e.g., the oxy-fuel gas type, plasma arc spray guns and electric arc spray guns. Combustion flame spray guns require a source of fuel, such as acetylene, and oxygen and the temperature produced therein are usually relatively low and often incapable of spraying materials having melting points exceeding 5,000°F.

Plasma arc spray guns are usually the most expensive type and they produce much higher temperatures than the combustion type, e.g. up to approximately 30,000°F. Furthermore, plasma arc spray gun require a source of inert gas, such as argon, for creation of the plasma, and the gas flow rate and electric power therefor require extremely accurate control for proper operation. On the other hand an electric arc spray gun simply requires a source of electric power and a supply of compressed air or other gas, as is well known, to atomize and to propel the melted material in the arc to the substrate or target (note column 1, lines 25-43).

In undertaking the method of Rondeau '367 a number of important advantages are realized over the prior art. Firstly, the process uses an electric arc spray gun, which is more economically operated than other thermal spray equipment. Second, the material to be sprayed is supplied as a wire, which is more convenient to use than powder. The wire may be thin strand all the way up to a relatively thick rod as long as it is suitable for spraying through an electric arc spray gun. Third, the wire is readily formed as an alloy of the two primary materials nickel and aluminum or nickel and titanium. Fourth, the cohesive, adhesive and hardness attributes of the coating on an article formed by the method of the invention are generally equivalent to or better than corresponding attributes for a coating on an article sprayed with powder using other thermal spray devices (note paragraph bridging columns 2-3).

Rondeau '367 can be further applied to teach that the wire alloy comprises a minimum of 93% nickel, from 4 to 5.2% aluminum, from 0.25 to 1.00% Ti (note column 4, lines 15-20).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use electric arc spraying method, instead of plasma spraying, to form the adhesive layer in Gorynin '302, as suggested by Rondeau '367 because electric arc spraying method can form the same diffusion bond between the two layers but it would cost less plus the additional advantages as stated above.

Optionally, Ishida '281 can be applied as stated above to teach that it is known in the art to form an adhesive layer on a substrate of a catalyst by using electric arc spraying process before depositing the catalytic layer in order to form a catalyst that is highly resistant to peel off (i.e. better bonding) (note column 7, lines 62-67).

EP '211 is applied as stated above to teach the desired shape of the catalyst member, i.e., a hollow cylinder.

It would have been obvious to roll the corrugated catalyst strip of Gorynin '302 into a hollow cylinder as suggested by EP '211 because such shape is desirable for an analogous application.

Applicant's arguments filed June 12, 2006 have been fully considered but they are not persuasive.

Applicants argue that in Ishida, it is disclosed that the metal plate "is preferably thin, but toughness of the metal plate is required in order not to easily yield to deformation", thus, the substrate in Ishida cannot be bent.

It should be noted that when a metal plate has "toughness", it does not mean that such metal plate is not flexible or cannot be bent. Dean et al (2001/0006008) (note paragraph [0022]), Tormala et al (6,221,075) (note column 1, lines 60-67) and Grothues-Spork et al (5,713,906) (note column 2, lines 10-12) are cited to teach that a metal plate or strip, such as stainless steel metal, can be "tough" and "flexible" or "ductile" at the same time.

Applicants argue that Figures 3 and 4 do not disclose or suggest that carries that can be bent.

In Figures 3 and 4, the corrugated shape of the metal plate can only obtained by bending the metal plate, thus, the metal plate in these Figures can definitely be bent.

Applicants argue that there is no teaching or suggestion in Ishida to bend the plates so that the anchor layer is retained after bending.

Since the anchor layer in Ishida is formed by the same method as in the claimed invention, such layer would inherently be retained after bending. There is no requirement for the actual bending in Applicants' claims.

Applicants argue that the corrugated member in Figures 3 and 7 is not a catalyst member.

Granted that the corrugated member in these Figures is not a catalyst member, however, it would have been obvious to one of ordinary skill in the art to replace the porous steel sheet (as used in Figures 12-13) with a corrugated porous steel sheet (as shown in Figure 16C) to form a hollow cylinder because the "steel sheet" as disclosed in EP '211 is not limited to just the porous sheet (note column 14, lines 17-22 of EP '211).

Applicants argue that EP '211 does not disclose or suggest a carrier having an intermetallic anchor layer for retaining a catalytic material.

EP '211 is only applied to teach the shape of the catalytic material, not to teach the intermetallic anchor layer.

Applicants argue that there is no reason for one skilled in the art to look to the teachings of EP '211, which does not include an intermediate layer, to provide a tube of corrugated construction having an anchor layer.

As stated in the above rejection, Ishida is applied to teach a catalyst having an intermediate layer on a metal substrate before applying the catalyst layer and EP '211 is applied to teach that a corrugated tube, among other shapes, is a known and conventional shape for the such catalyst application.

Applicants argue that Ishida teaches away because Ishida discloses that the plates should be rigid and not deformable.

In Ishida, "deformation" would refer to any undesirable change in shape of the plate. This does not include all the possible changes in the shape of the metal plate, as evidence by the "bent" shape as shown in Figures 3-4. Again, Dean et al (2001/0006008) (note paragraph [0022]), Tormala et al (6,221,075) (note column 1, lines 60-67) and Grothues-Spork et al (5,713,906) are cited to teach that the stainless steel metal plate as used in Ishida can both be tough and flexible.

Applicants argue that Ishida and EP '211 do not disclose other specific physical features for the catalyst.

Depending on the intended use for the catalyst, it would have been obvious to one of ordinary skill in the art to select proper physical features for the catalyst.

Applicants argue that Donomoto discloses coating a composite fiber/light alloy formed on a body with NiCrAl alloys by plasma spraying to form automobile engine parts, not on a carrier substrate by electric arc spraying to provide a catalyst member.

Regardless of how the NiCrAl alloys were applied and for what purpose, the NiCrAl alloys as disclosed in Donomoto are specifically described as heat and corrosion resistant alloys. Since the metal in Ishida '281 is desired to be heat and corrosion resistance, it would have been obvious to one of ordinary skill in the art to use any known, commercially available heat and corrosion resistance, such as the NiCrAl alloys suggested by Donomoto, for the product of Ishida '281.

The rejection using Draghi is maintained for the same reason as stated above.

Applicants argue that no statement or reasoning as to why one skilled in the art would have combined the teachings of Gorynin and EP '211.

The above rejection is clarified to explain the reason for combining the Gorynin and EP '211.

Applicants argue that Rondeau does not pertain to catalyst members.

In both Rondeau and Gorynin, the main object is to improve the bonding between the coating and the substrate. They are considered as analogous art in that respect. Since the method as disclosed in Rondeau would provide a coating with excellent bonding, just as in Gorynin, but with lower cost, it would have been obvious to one

skilled in the art to use the process of Rondeau to produce the product of Gorynin to minimize the production cost.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner is currently on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Stanley Silverman can be reached on (571) 272-1358. The fax phone

numbers for the organization where this application or proceeding is assigned are (703) 872-9306 or (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed (571) 272-1700.

Ngoc-Yen Nguyen

Ngoc-Yen M. Nguyen
Primary Examiner
Art Unit 1754

nmn
August 21, 2006